In re Appln. of Nicol et al.
Application No. 10/582,834
Response to Final Office Action of December 23, 2008

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Claim 1 (currently amended): <u>A method for operating a device for generating a synthesized and spatialized acoustic signal</u> ~~An acoustic synthesis and spatialization method~~, in which a synthetic sound to be generated is characterized by the nature of a virtual acoustic source and its position relative to a chosen origin,
wherein the method comprises a joint step of determining parameters including at least one gain, for defining, at the same time:

- a loudness characterizing the nature of the source, and
- the position of the source relative to a predetermined origin.

Claim 2 (previously presented): The method as claimed in claim 1, in which the spatialization of the virtual source is performed in an ambisonic context, further comprising a step for calculating gains associated with ambisonic components in a spherical harmonics base.

Claim 3 (previously presented): The method as claimed in claim 1, in which the synthetic sound is intended to be reproduced in a holophonic, or binaural, or transaural context, on a plurality of reproduction channels,
wherein, during said joint step, a delay between reproduction channels is also determined, to define at the same time:

- a triggering instant of the sound characterizing the nature of the source, and
- the position of the source relative to a predetermined origin.

Claim 4 (previously presented): The method as claimed in claim 3, wherein the nature of the virtual source is parameterized at least by a temporal loudness variation, over a chosen duration and including a sound triggering instant.

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Claim 5 (previously presented): The method as claimed in claim 4, wherein said variation comprises at least:
- an instrumental attack phase,
- a decay phase,
- a sustain phase, and
- a release phase.

Claim 6 (previously presented): The method as claimed in claim 3, wherein the spatialization of the virtual source is performed by a binaural synthesis based on a linear breakdown of transfer functions, these transfer functions being expressed by a linear combination of terms dependent on the frequency of the sound and weighted by terms dependent on the direction of the sound.

Claim 7 (previously presented): The method as claimed in claim 6, wherein the direction is defined by at least one bias angle and, preferably, by a bias angle and an elevation angle.

Claim 8 (previously presented): The method as claimed in claim 6, wherein the position of the virtual source is parameterized at least by:
- a number of filterings, dependent on the acoustic frequency,
- a number of weighting gains each associated with a filtering, and
- a delay for each "left" and "right" channel.

Claim 9 (previously presented): The method as claimed in claim 1, wherein the nature of the virtual source is parameterized by at least one acoustic timbre, by associating the chosen relative loudnesses with harmonics of a frequency corresponding to a pitch of the sound.

Claim 10 (previously presented): The method as claimed in claim 1, wherein the method provides for an acoustic synthesis engine to generate spatialized sounds, relative to said predetermined origin.

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Claim 11 (previously presented): The method as claimed in claim 10, in which the synthesis engine is implemented in a music editing context, wherein the method also provides for a man-machine interface to place the virtual source in a chosen position relative to the predetermined origin.

Claim 12 (previously presented): The method as claimed in claim 11, in which a plurality of virtual sources to be synthesized and spatialized are provided, wherein each source is assigned to a respective position.

Claim 13 (previously presented): A module for generating synthetic sounds, comprising in particular a processor, wherein it also includes a working memory for storing instructions for implementing an acoustic synthesis and spatialization method, in which a synthetic sound to be generated is characterized by the nature of a virtual acoustic source and its position relative to a chosen origin,
the method comprising a joint step of determining parameters including at least one gain, for defining, at the same time:
       - a loudness characterizing the nature of the source, and
       - the position of the source relative to a predetermined origin.

Claim 14 (previously presented): A computer program product, stored in a memory of a central processing unit or a terminal, in particular a mobile terminal, or on a removable medium specifically for cooperating with a drive of said central processing unit, comprising instructions for implementing an acoustic synthesis and spatialization method, in which a synthetic sound to be generated is characterized by the nature of a virtual acoustic source and its position relative to a chosen origin,
the method comprising a joint step of determining parameters including at least one gain, for defining, at the same time:
       - a loudness characterizing the nature of the source, and
       - the position of the source relative to a predetermined origin.

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Claim 15 (previously presented): A communication terminal, including a module for generating synthetic sounds comprising a processor and a working memory for storing instructions for implementing an acoustic synthesis and spatialization method, in which a synthetic sound to be generated is characterized by the nature of a virtual acoustic source and its position relative to a chosen origin,

the method comprising a joint step of determining parameters including at least one gain, for defining, at the same time:

- a loudness characterizing the nature of the source, and
- the position of the source relative to a predetermined origin.